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ABSTRACT

Participation in school activities is hypothesized to be a determinant of the measured abilities and interests of high school students. The Ball Aptitude Battery (yielding 14 ability scores), Holland's (1970) self directed search interest inventory, and a biographical information blank (to obtain information about participation in 53 extracurricular activities) were administered to over 900 high school seniors of both sexes. Correlational and multiple regression analyses showed different patterns of activity participation to be related to different abilities and interests. The degree of relationship was generally low, generally higher for the males than for the females, and higher for interests than for abilities. Activity correlates of abilities differed for the sexes, but activity correlates of interests tended to be similar. This suggests that the same ability can result from differential participation in activities, but the same interest develops from similar activities. (Author)

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Technical Report No. 12

THE RELATIONSHIP OF PARTICIPATION IN SCHOOL ACTIVITIES TO ABILITIES AND INTERESTS IN A HIGH SCHOOL STUDENT SAMPLE

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Abstract

Participation in school activities is hypothesized to be a determiner of the measured abilities and interests of high school students. The Ball Aptitude Battery (yielding 14 ability scores), Holland's (1970) self directed search interest inventory, and a biographical information blank (to obtain information about participation in 53 extracurricular activities) were administered to over 900 high school seniors of both sexes. Correlational and multiple regression analyses showed different patterns of activity participation to be related to different abilities and interests. The degree of relationship was generally low, generally higher for the males than for the females, and higher for interests than for abilities. Activity correlates of abilities differed for the sexes, but activity correlates of interests tended to be similar. This suggests that the same ability can result from differential participation in activities, but the same interest develops from similar activities.

The Relationship of Participation in School Activities to Abilities and Intersts in a High School Student Sample[1]

It is a well documented finding in vocational psychology that measurements of abilities and interests are only minimally correlated (Barak, 1981; Keierleber, 1981; Super & Crites, 1962). This state of affairs poses no major problem for vocational counselors. To the contrary, the relative independence of the two domains implies that the combination of ability and interest is potentially a more powerful predictor than either variable set taken alone. In practice, vocational counselors have followed the lead of Darley and Hagenah (1955) who view abilities as "efficiency variables" that are instrumental in attaining desired goals, and interests as including or reflecting such goals.

Nevertheless, the belief that abilities and interests should be related in some manner continues to be entertained by vocational psychologists, especially by those with a personality-theory orientation. One of the basic assumptions of personality theory is that personality is internally consistent. If abilities and interests are aspects of the same internally consistent personality, the finding of a low level of relationship between the two domains requires explication.

One hypothesis toward such explication is that the two variable sets (abilities and interests) result from or develop out of a third variable set, participation activities. As Holland (1973) states (in paraphrase): People learn to prefer certain activities over others. Participation in such activities leads to strong interests and to the

development of certain abilities (competencies). The resulting pattern of interests and abilities produces a characteristic predisposition that is identifiable as a personality type. Ferguson (1956) has advanced the view that abilities are the stabled resultants of participation in various activities. Strong (1960) has taken the position that interests are learned likings or dislikings for activities. Following these conceptualizations, the point of convergence between abilities and interests obviously lies in the activities in which individuals have participated. Different patterns of participation in activities should result in different abilities and different interests.

The present study explores the relationship of participation in school activities (as given in self-report) to multiple abilities and multiple interests. A key feature of this study is its multivariate nature (previous studies were typically bivariate in design). The subjects of the study were high school seniors. At this age level abilities are well differentiated (Conrad, Freeman, & Jones, 1944). Basic interests--in particular, as related to the Holland personality types--are also well differentiated at this age level (Holland, 1973). This fulfills the condition of adequate variability in the variables that is a necessary prerequisite if the postulated relationship between previous activities and present abilities and interests is to be uncovered.

Method

The data for this study were obtained in the course of the development and validation of a new multiple ability test battery, the Ball Aptitude Battery (BAB; Sung, Dawis, & Dohm, 1981; Sung & Dawis 1981b).

The then experimental BAB consisted of the following 12 tests: Clerical, Idea Fluency, Inductive Reasoning, Word Association, Writing Speed, Paper Folding, Vocabulary, Ideaphoria, Finger Dexterity, Grip, Shape Assembly, and Analytical Reasoning. The 12 tests yielded 14 scores (two each for Finger Dexterity and Grip, each hand scored separately). Corrected splithalf reliabilities for the tests ranged from .83 to .89, while test-retest reliabilities (over a 6-week interval) ranged from .64 to .98, with a median of .79 (Sung & Dawis, 1981b). The validity of the BAB is supported by evidence of convergent and discriminant validity (Sung & Dawis, 1981a, 1981b), criterion-related validity in the prediction of high school grades (multiple Rs ranging from .33 to .64, median R = .49) and discrimination of membership among occupational groups (78% correct classification) and vocational school trainee groups (61% correct classification) (Sung & Dawis, 1981b).

Data for interests were obtained through the use of a version of the Vocational Preference Inventoy (VPI), as given in the Self Directed Search (Holland, 1970). The inventory yielded six interest scores: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Reliabilities for the interest scores were all above .70, with a median of .75. The validity of the inventory as a measure of basic interests rests on the extensive literature supporting the validity of the VPI (Holland, 1973).

Data on school activity participation were obtained through the use of a biographical information (questionnaire that also included the interest inventory). One of the sections of this questionnaire asked for

the self-report of participation during the high school years, in 53 different sports, hobbies, and other extracurricular activities. A 3-point rating scale (Not Active/Involved, Somewhat Active/Involved, and Strongly Active/Involved) of participation was used for 37 items that asked for degree of involvement. For 15 items that asked for length of involvement, a 4-point rating scale was used (Never, 1 year, 2 years, 3 or 4 years). The remaining item was a 6-point rating of number of officership in any school organization (Never to 5 or more). These items were selected because response to the items had a clearly behavioral (observable) basis and, in principle, could be verified.

Mean differences in participation level were observed between the sexes for 31 of the 53 items, with female students having the higher means on 20 of the 31 items. Factor analyses (principal axes, orthogonal solution, Kaiser criterion, varimax rotation) of the school activity participation data, separately for females and males, yielded 10 factors for each sex group, 5 of which were highly similar and the remaining 5 differing only in minor respects. Nevertheless, 10 scales were developed separately for each gender sample, based on the factor loading patterns. Table 1 lists the factor-based school activity participation scales and the highest loading items for each scale, for each gender sample.

Insert Table 1 about here

Data on the ability, interest, and school activity participation variables described above were collected from over 900 high school seniors in 32 public and private schools in Illinois and Texas. The sample was about half female (54%), half from Illinois (51%); 17% were hispanic, 26% were black, and 53% were white. Almost half (46%) of the white students but only 19% of the black and 16% of the hispanic students were in the uppermost third of the distribution.

The BAB tests were administered by trained test administrators following procedures detailed in a provisional manual. These procedures are practically the same as those described in the published manual (Sung, Dawis, & Dohm, 1981). Ability test administration was divided into two parts, constituting the first and the last (third) periods of the data collection session. The biographical information questionnaire used to obtain data on school activity participation and interests was administered in the middle period of the data collection session.

Results

In line with previous findings, the relationships between abilities and interests were low to moderate in level. Zero-order cross-correlations for the female sample were largely positive (21% were negative), and mostly below .15, with a median of .07. Almost half of the *rs* (41 of 84, or 49%) were nonsignificant. For the male sample, the zero-order cross-correlations were all positive, also mostly below .15, with a median of .10, and with 36 of 84 *rs* (43%) being nonsignificant.

The multiple regression of ability on interests produced *Rs* ranging from .12 to .46, with a median of .23 for the female sample, and from

.08 to .31, with a median of .21 for the male sample. Regressing interest on abilities resulted in Rs from .20 to .42, with a median of .31 for the females, and from .22 to .32 with a median of .24 for the males. Table 2 displays more details of the correlational findings.

Insert Table 2 about here

The correlation of participation in school activities with ability resulted in generally low correlations. The rs for the female sample ranged from -.15 to .25, median of .04, with 41% (58 of 140) of the rs being significant at the .05 level. For the male sample, the rs ranged from -.08 to .21, median of .07, with 50% (70 of 140) being significant. The male sample had significantly more correlations above the total sample median than did the female sample; that is, the level of ability-activity correlation was generally higher for the male sample (X^2 = 12.87, df = 1).

When ability was regressed on school activity participation, the resulting Rs for the female sample ranged from .11 to .30, with a median of .18. The Domestic Arts and Crafts scale was the most frequently occurring predictor of ability, followed by the Student Organizations and Other Sports scales. For the male sample, the Rs ranged from .12 to .31, with a median of .21. The most frequently appearing predictor of ability was the Student Organizations scale, followed by Nature-related and Team Sports scales. The two samples did not differ in the level of Rs obtained by regressing ability on school activity participation.

Correlating school activity with interest participation resulted in higher Pearson rs than were observed for the ability-activity relationships. For the female sample, the rs ranged from -.02 to .28, median of .16, with all but 7 of the 60 rs significant at the .05 level. For the male sample, the rs were from .07 to .29, median of .18, with all but 1 of the 30 rs significant. The difference in distribution of rs between the samples was significant (X^2 = 5.27, df = 1), again with the male sample having a higher level of interest-ability correlation.

Regressing interest on school activity participation resulted in Rs for the female sample ranging from .26 to .37, with a median of .35. For the male sample, the Rs ranged from .27 to .33, with a median of .31. The most frequently appearing predictor of interest was Student Organizations for the female sample, and the Student Organizations and Other Sports scales for the male sample. The Rs for the female sample were significantly higher than those for the male sample (X^2 = 5.99, df = 1).

The summary data on the relationships of school activity participation with abilities and interests are presented in Table 3.

Insert Table 3 about here

Participation in different school activities was differentially related to abilities and interests, and the patterns differed for the sexes. Participation in arts and crafts was most related to abilities for the female sample, followed by participation in nature-related

activities, industrial arts, organizations, and sports. With regard to interests, participation in organizations, industrial arts, sports and arts and crafts showed the most relationships for the female sample. For the male sample, participation in organizations was most related to both abilities and interests followed by participation in sports, music-related and nature-related activities. These findings are detailed in Table 4.

Insert Table 4 about here

To investigate further the difference between the sexes in the pattern of relationships between activities and abilities or interests, the correlation between female and male patterns of rs was computed for each ability and each interest. For the abilities, these correlations ranged from -.65 (for Finger Dexterity-Right) to .34 (for Grip-Left), with a median of -.03. Nine of the 14 correlations were negative. Other sizable negative correlations were observed for Idea Fluency (-.62), Finger Dexterity-Left (-.53), and Clerical (-.43). For interests, the correlations ranged from -.10 (for Artistic) to .70 (for Investigative), with a median of .33. Only the correlation for Artistic was negative. Other sizable positive correlations included .52 for Social and .46 for Enterprising. It would appear that the activity correlates of ability were different for the sexes but the activity correlates of interest tended to be more similar for the two samples.

Discussion

This study was conducted to investigate the hypothesis that abilities and interests result, in part, from differential participation in activities. In this study, the focus was on school activities. The data from this study show that participation in school activities was indeed related to different abilities and different interests. However, the degree of the observed relationships was not much better than the modest relationships observed between abilities and interests for the same samples of high school seniors. On the average, school activity participations accounted for about 4% of the ability variance and about 10% of the interest variance, with a rnage from 0% to 9% for abilities, and 7% to 14% for interests.

It can be seen from Tables 3 and 4 that the relationships with school activity participation were differential. First of all, school activity participation appeared to be related more to interests than to abilities. This was the case for both female and male samples. Among interests, participation was related more to Realistic, Investigative, Artistic, and Social interests and less to Enterprising and Conventional interests. Among abilities, it was related more to verbal and spatial abilities and less to motor and perceptual abilities. Participation in different school activities showed different levels of correlation with abilities and interests. The patterns of such correlation generally differed for the sexes, but they were more alike for interests than for abilities. It must be pointed out, however, that the present findings need to be interpreted in the light of domain coverage of the three

classes of variables and the fact that the distributions for school activity participation are invariably positively skewed.

Perhaps this study does provide some clues toward the explication of the low ability-interest correlation. That activity participation correlates of ability differed for the sexes suggests that the same ability can be developed or enhanced by different activities. In other words, the same "maximum performance" score (Cronbach, 1970) manifested on an ability test could have been due to participation in different activities by different people. This hypothesis is compatible with Ferguson's (1956) view mentioned earlier. It also suggests the view of an ability as a component of many activities.

In contrast, this study suggests that participation in particular activities may be related to the development of particular basic interests. It suggests the view, similar to Strong's (1960), that interests, as an affective (liking-disliking) response, has to be directed at a particular activity. It is interesting to note that the activity correlates of interest were similar for the sexes, despite the fact that the sexes differed in their (reported) participation rates for a majority of the activities studied. Interests, then, may provide clues to the distribution of previous behavior, and in this regard can be aptly viewed as indicators of "typical performance" (Cornbach, 1970).

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Footnote

[1]This report is an expanded version of a paper presented at the 1982 annual meeting of the American Psychological Association in Washington, DC.

Table 1

Factor-based Scales of School Activity Participation, by Gender Sample

Scale	Highest Loading Items	
	Female Sample	Male Sample
Team Sports	Softball (.73)[a] Volley ball (.70)	Softball (.80)[a] Basketball (.75)
Industrial Arts	Mechanics, Auto repair (.62) Making jewelry, pottery (.51)	Mechanics, Auto repair (.68) Repairing, building electronics (.63)
Student Organizations	Leadership position (.60) School newspaper, yearbook (.45)	Leadership position (.67)
Recreational	Indoor games (pool, ping pong, bowling) (.60)	Indoor games (pool, ping pong, bowling) (.58)
Other Organizations	Military (ROTC, etc.) (.40) Hobby clubs (.30)	Military (ROTC, etc.) (.46) Motorcycle, auto racing (.32)
Other Sports (A)	Athletic clubs (.35) Swimming (.36)	Athletic clubs (.69) Track and field (.52)
Music-related	Music club (band, singing orchestra) (.63)	Playing musical instrument (.58)
Other Sports (B)	Golf (.45) Hunting, fishing (.42)	Volley ball (.60) Badminton (.54)
Arts and Crafts	Sewing (.48) Knitting, crocheting, needlepoint (.45)	Making jewelry, pottery, sculptures (.48) Sewing (.34)
Nature-related	Water sports (.63) Raising pets and animals (.56)	Indoor plants (.65) Gardening (.46)

Note. Female sample N = 548; male sample N = 435.

[a]Factor loading in parenthesis.

Table 2

Correlation between Ability and Interest, by Gender Sample

Dependent Variable[a]	Female Sample			Male Sample		
	$\bar{r}$[b]	s_r[c]	R	$\bar{r}$	s_r	R
Ability						
Clerical	020	071	270	095	046	215
Idea Fluency	072	081	294	118	031	201
Inductive Reasoning	050	075	283	078	047	212
Word Association	-053	053	151	073	030	155
Writing Speed	010	024	157	107	022	162
Paper Folding	128	103	363	092	076	307
Vocabulary	200	121	457	167	056	300
Ideaphoria	170	072	326	125	037	216
Finger Dexterity-Left	033	031	124	057	038	165
Finger Dexterity-Right	-022	045	174	027	016	078 ns
Grip-Left	037	035	139	065	044	213
Grip-Right	045	051	204	050	043	191
Shape Assembly	057	066	216	100	065	269
Analytical Reasoning	108	059	235	142	036	244
Interest						
Realistic	062	102	333	106	043	263
Investigative	089	107	374	129	074	322
Artistic	133	122	416	095	049	247
Social	067	064	281	081	055	234
Enterprising	040	058	244	076	043	217
Conventional	014	047	198	067	053	227

Note. Decimal points are omitted. Female sample N = 524; male sample N = 435.

[a]Dependent variable in the multiple regression of each ability variable on 6 interest variables or of each interest variable on 14 ability variables. All Rs are significant at the .05 level unless indicated otherwise (with ns). [b]Mean r between each listed dependent variable and all variables of the other domain. An r of .07 or greater for the female sample, or .08 or greater for the male sample, is significant at the .05 level. [c]Standard deviation of distribution of rs between each listed dependent variable and all variables of the other domain.

Table 3

Simple and Multipe Correlation of Ability and Interest with School Activity Participation, by Gender Sample

Dependent Variable[a]	Female Sample			Male Sample		
	$\bar{r}$[b]	s_r[c]	R	$\bar{r}$	s_r	R
Ability						
Clerical	013	027	117 ns	046	079	287
Idea Fluency	075	041	209	098	046	228
Inductive Reasoning	087	114	295	047	037	152
Word Association	-043	041	169	-033	036	189
Writing Speed	023	033	120 ns	068	070	275
Paper Folding	096	078	255	060	029	119
Vocabulary	094	085	277	123	074	301
Ideaphoria	128	071	268	123	071	308
Finger Dexterity-Left	023	033	147	106	023	176
Finger Dexterity-Right	-009	035	129 ns	143	026	222
Grip-Left	-010	056	172	016	040	165
Grip-Right	-013	041	145	015	031	132
Shape Assembly	021	070	181	017	027	169
Analytical Reasoning	093	103	245	128	049	255
Interest						
Realistic	161	047	340	166	064	317
Investigative	164	056	364	228	040	330
Artistic	187	088	358	166	050	321
Social	176	071	372	175	060	305
Enterprising	121	044	268	166	029	256
Conventional	101	051	257	175	051	290

Note. Decimal points are omitted. Female sample N = 524; male sample N = 435.

[a]Dependent variable in the multiple regression of each ability or interest variable on the 10 activity participation variables. All Rs are significant at the .05 level unless indicated otherwise (with ns). [b]Mean r between each listed dependent variable and 10 activity participation variables. [c]Standard deviation of distribution of rs between each listed dependent variable and 10 activity participation variables.

Table 4

Correlation of School Activity Participation with Abilities and Interests, by Gender Sample

School Activity	Female Sample			Male Sample		
	$\bar{r}$[a]	s_r[b]	N sig r[c]	$\bar{r}$	s_r	N sig r
Ability						
Team Sports	-001	050	4	081	055	9
Industrial Arts	084	082	7	046	054	3
Student Organizations	-014	055	3	099	099	10
Recreational	026	036	3	006	050	2
Other Organizations	071	081	7	091	079	8
Other Sports (A)	052	077	7	073	062	7
Music-related	-027	058	5	064	072	9
Other Sports (B)	017	063	5	096	052	9
Arts and Crafts	119	076	10	041	051	5
Nature-related	087	088	7	086	066	8
Interest						
Team Sports	140	021	6	127	033	6
Industrial Arts	196	031	5	163	070	6
Student Organizations	197	038	6	202	066	5
Recreational	123	033	6	155	049	6
Other Organizations	218	059	6	233	041	6
Other Sports (A)	183	030	6	210	041	6
Music-related	070	042	3	200	050	6
Other Sports (B)	073	052	3	153	029	6
Arts and Crafts	177	055	6	170	026	6
Nature-related	145	061	5	178	031	6

Note. Female sample $N = 524$; male sample $N = 435$.

[a]Mean r between each listed school activity variable and all ability variables or all interest variables as the case may be. An r of .07 or greater for the female sample, or .08 or greater, for the male sample, is significant at the .05 level. Decimal points are omitted. [b]Standard deviation of rs between each listed school activity variable and all ability or all interest variables as the case may be. Decimal points are omitted. [c]Number of significant ($p < .05$) rs out of a maximum possible 14 for ability variables or 6 for interest variables.